8.1 **Performance Studies of Common Effluent Treatment Plants (CETPs) at Bhiwadi and Pali (Rajasthan)**

CETP, Bhiwadi: The CETP was designed by SPANS Envirotech Pvt. Limited, New Delhi and was constructed jointly by GSJ Envo Limited, New Delhi. The CETP was initially designed for hydraulic loading of 6 MLD but subsequently revamped for 7.5 MLD. Designed parameters for CETP outlet are pH 5.5-9.0, BOD less than 100 mg/l and suspended solids less than 200 mg/l.

The Commissioner, Alwar has constituted one committee under his chairmanship, in which BMA has been made responsible for operation and maintenance of Bhiwadi CETP. The Committee has taken charge from RIICO for O&M of CETP. The Committee has finalized tender for capacity enhancement of CETP from 6 MLD to 12 MLD.

CETP Bhiwadi was monitored by a team from CPCB Zonal office, Bhopal during 20-23, August 2007. Four hourly Composite samples were collected for unit wise performance evaluation of the CETP. The flow of CETP inlet chamber was observed in the range of 3.0 to 7.5 MLD, while average flow being 6.5 MLD. The designed outlet concentration for BOD was 100 mg/l which is generally applicable for discharge of effluent for irrigation. However, the treated effluent was being discharged in storm water drain which ultimately join river Sabi. The Monitoring results are presented below:

Based on monitoring studies, following recommendations have been suggested:

- Capacity of CETP may be enhanced to 15 MLD.
- Equalization tank may be added in CETP to ensure uniform quality of effluent for aeration tank and absorb shock loads.
- Grit and floating material removal systems should be made mechanical.
- Floating aerators may be replaced by fixed aerators.
- Proper trained staff should be engaged for operation of CETP. It was observed that during night hours no trained staff is deputed for caring the operation.
- The sluice gate at inlet chamber should be repaired immediately as it is corroded.
The return sludge line should be modified to enable proper control and proportionate distribution of return sludge.

At least three pumps should be operational to discharge treated effluent.

Proper records should be maintained in laboratory for operational parameters as well as for generation and storage of CETP sludge. HW generation return should timely be submitted to SPCB in time.

### Table 8.1.1 Performance Monitoring Results of CETP Bhiwadi

<table>
<thead>
<tr>
<th>Location</th>
<th>pH</th>
<th>TDS</th>
<th>TSS</th>
<th>COD</th>
<th>BOD</th>
<th>Cl</th>
<th>SO₄</th>
<th>F</th>
<th>NH₃-N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet to CETP (C)</td>
<td>3.04</td>
<td>8552</td>
<td>2167</td>
<td>483</td>
<td>146</td>
<td>81</td>
<td>1837</td>
<td>1.43</td>
<td>97</td>
</tr>
<tr>
<td>Inlet to CETP (G)</td>
<td>4.31</td>
<td>4494</td>
<td>494</td>
<td>561</td>
<td>135</td>
<td>1242</td>
<td>2411</td>
<td>1.48</td>
<td>99</td>
</tr>
<tr>
<td>Before Aeration Tank (C)</td>
<td>3.84</td>
<td>3520</td>
<td>180</td>
<td>455</td>
<td>126</td>
<td>1079</td>
<td>1690</td>
<td>1.44</td>
<td>102</td>
</tr>
<tr>
<td>Before Aeration Tank (G)</td>
<td>5.08</td>
<td>4298</td>
<td>189</td>
<td>410</td>
<td>128</td>
<td>1323</td>
<td>2281</td>
<td>1.48</td>
<td>74</td>
</tr>
<tr>
<td>Before Secondary Clarifier (C)</td>
<td>5.52</td>
<td>3282</td>
<td>219</td>
<td>430</td>
<td>147</td>
<td>1023</td>
<td>2205</td>
<td>1.49</td>
<td>64</td>
</tr>
<tr>
<td>Before Secondary Clarifier (G)</td>
<td>5.73</td>
<td>3492</td>
<td>126</td>
<td>398</td>
<td>135</td>
<td>1041</td>
<td>1793</td>
<td>1.47</td>
<td>86</td>
</tr>
<tr>
<td>After Secondary Clarifier (C)</td>
<td>5.66</td>
<td>3140</td>
<td>151</td>
<td>406</td>
<td>119</td>
<td>1099</td>
<td>1446</td>
<td>1.45</td>
<td>57</td>
</tr>
<tr>
<td>After Secondary Clarifier (G)</td>
<td>5.80</td>
<td>2866</td>
<td>223</td>
<td>389</td>
<td>106</td>
<td>1593</td>
<td>1222</td>
<td>1.42</td>
<td>61</td>
</tr>
<tr>
<td>Final Outlet (G)</td>
<td>6.11</td>
<td>2968</td>
<td>112</td>
<td>373</td>
<td>87</td>
<td>884</td>
<td>1476</td>
<td>1.60</td>
<td>70</td>
</tr>
</tbody>
</table>

C - Composite samples, G – Grab samples

### Table 8.1.2 Performance Monitoring Results of CETP at Pali, Rajasthan

<table>
<thead>
<tr>
<th>Location</th>
<th>pH</th>
<th>TDS</th>
<th>TSS</th>
<th>COD</th>
<th>BOD</th>
<th>Cl</th>
<th>SO₄</th>
<th>NH₃-N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equalization Tank Unit I</td>
<td>8.47</td>
<td>7540</td>
<td>440</td>
<td>1542</td>
<td>926</td>
<td>2142</td>
<td>2058</td>
<td>34</td>
</tr>
<tr>
<td>After Primary Clarifier 1.15 MGD</td>
<td>8.08</td>
<td>7764</td>
<td>252</td>
<td>1313</td>
<td>640</td>
<td>2593</td>
<td>2164</td>
<td>44</td>
</tr>
<tr>
<td>Equalization Tank Unit II</td>
<td>8.19</td>
<td>7492</td>
<td>544</td>
<td>2382</td>
<td>1088</td>
<td>1790</td>
<td>2117</td>
<td>30</td>
</tr>
<tr>
<td>After Primary Clarifier 1.85 MGD</td>
<td>7.69</td>
<td>7504</td>
<td>446</td>
<td>1741</td>
<td>884</td>
<td>1763</td>
<td>2199</td>
<td>38</td>
</tr>
<tr>
<td>Equalization Tank Unit III</td>
<td>7.50</td>
<td>7312</td>
<td>943</td>
<td>1519</td>
<td>127</td>
<td>2056</td>
<td>1194</td>
<td>08</td>
</tr>
<tr>
<td>After Primary Clarifier 2.0 MGD</td>
<td>8.32</td>
<td>4292</td>
<td>413</td>
<td>855</td>
<td>482</td>
<td>721</td>
<td>1964</td>
<td>37</td>
</tr>
<tr>
<td>Equalization Tank Unit IV</td>
<td>8.16</td>
<td>4060</td>
<td>418</td>
<td>1191</td>
<td>643</td>
<td>748</td>
<td>1223</td>
<td>35</td>
</tr>
<tr>
<td>After Secondary Clarifier</td>
<td>7.51</td>
<td>4228</td>
<td>508</td>
<td>321</td>
<td>46</td>
<td>743</td>
<td>600</td>
<td>06</td>
</tr>
</tbody>
</table>

MLSS observed in three Units: Unit I-3547 mg/l, Unit II-3678 mg/l, Unit III-3890 mg/l
DO observed in three Units: Unit I-1.08 mg/l, Unit II-1.08 mg/l, Unit III-0.77 mg/l
Unit I: Design flow 217 M3/hr, Observed flow 220 M3/hr, Peak flow 220 M3/hr
Unit II: Design flow 350 M3/hr, Observed flow 380 M3/hr, Peak flow 430 M3/hr
Unit III: Design flow 378 M3/hr, Observed flow 410 M3/hr, Peak flow 430 M3/hr
CETPs, Pali: Three CETPs of 1.15, 1.85 and 2.0 MGD capacity were commissioned at Pali, Rajasthan in 1983, 1997 and 1999 respectively. Initially CETPs were constructed by RIICO and NEERI and further upgradation was carried out by M/s Advent Envirocare Technology Pvt. Limited, Ahmedabad. The upgradation of these CETPs was completed and became operational on full load capacity with effect from September 2007.

The CPCB Central Zonal Office, Bhopal visited Pali during December, 5-6, 2007 for performance evaluation of CETPs and status review of problem area action plan. Four hourly composite samples were taken during 24-hrs. monitoring for unit wise performance evaluation of all three CETPs. The physiochemical parameters as well as specific parameters like heavy metals and pesticides have been analyzed. The designed outlet concentration for BOD is 30mg/l, COD 250 mg/l and TSS 100 mg/l, which are generally applicable for discharge of effluent in water bodies. The treated effluent joins seasonal river Bandi located adjacent to CETP premises. Recently CETP trust has provided power back up of 320 KVA (unit-I), 600 KVA (unit-II) and 600 KVA (unit-III) to ensure CETPs operation during power shedding. The observations are detailed below :

Unit I and II

Both units of CETP were found operational on full capacity at the time of monitoring. Operational status and monitoring of controlling parameters i.e. pH 7-9, MLSS 3500 – 4000 mg/l and DO 0.5 – 1.5 mg/l were found satisfactory.

The influent for unit I and II are common and both units are located in same premises. Total effluent coming to these CETPs are approximately 15 MLD against their designed capacity of 13.6 MLD.

Proposed up gradation in unit II has been completed which includes replacement of floating aerators with fixed type, addition of one more equalization tank and addition of centrifuge facility for sludge dewatering. Three numbers of sludge dewatering system have been installed. Capacity of each dewatering system is 28 cum per hour. At a time only two can be operated.

Performance of CETP unit I was found better as compared to earlier monitoring undertaken during February 2006. BOD removal in unit I was found 96 % and COD 83%. MLSS (3547 mg/l) and DO (1.08 mg/l) in aeration tank of unit-I indicates regular operation of CETP.

CETP unit II was started after upgradation in the end of September 2007 and was under stabilization. However DO (1.08 mg/l) and MLSS (3678 mg/l) of aeration tank indicates that stabilization of CETP is very fast and may achieve required norms after complete stabilization within three months time given by RPCB in consent to operate.

Unit III

The installed capacity of unit III is 9.08 MLD and was found operational on full capacity at the time of monitoring. Operational status and monitoring of controlling parameters were found satisfactory.

Overflowing of Kutcha drains and non scientific disposal of solid waste has affected cities adversely
The quantity of wastewater at the inlet of plant was observed approximately 12 MLD at the time of monitoring against the designed capacity of 9.08 MLD.

City waste water as well as industrial waste water from mill area and Mahaveer Nagar is collected through 8 kilometers long pucca drain up to CETP unit III. Overflow was observed from barrier constructed near unit III. It was observed that approximately 25% of untreated wastewater overflows every day during morning and evening time.

Proposed upgradation in unit III has been completed which included replacement of floating aerators with fixed type, addition of one more equalization tank and addition of centrifuge facility for sludge de-watering. Three numbers of sludge de-watering system have been installed. Capacity of each dewatering system is 28 cum per hour. At a time only two can be operated.

After completion of upgrading work CETP unit III was started in the end of September 2007. DO (0.77 mg/lt) and MLSS (3890 mg/lt) of aeration tank indicates regular operation of CETP. BOD removal in unit III was found 90% and COD 62% which is improved.

8.2 General Observation and Recommendations:

Cemented floor (200 X 100 ft) and covered shed (100 X 100 ft) have been provided at CETP for temporary storage of sludge. The authorization for management of hazardous waste (7.2 TPD category 34.4) has been issued by RPCB and is valid up to August 2009 with condition of its final disposal within 90 days.

During January 2007 to November 2007 a total of 3489.84 MT sludge has been disposed by CETP. 2027.37 MT sludge has been given to Rajasthan Waste Management, Udaipur and 1462.47 MT to M/s Binani Cement Limited, Pindwada. Proper record of sludge generation and disposal is being maintained by CETP.

Civil construction of new laboratory was in progress in premises of CETP I and II. Procurement of more new instruments will be done after construction of new laboratory.

CETP trust have valid consent under the Water Act for all three CETPs and also valid authorization for handling of CETP sludge.

Overflowing of Kutcha drains and non scientific disposal of solid waste has affected the city adversely.

Due to non availability of desired dilution in the river, even the treated wastewater is enough to deteriorate the river water quality.

State Government of Rajasthan has allotted land in village Khutdi of Tehsil Rohat in district Pali for construction of sludge disposal site.

Collection and conveyance of waste water continue to be poor. In the industrial area, the drains are not cleaned regularly thus choking is quite frequent.

The groundwater in Pali area is not fit for drinking purpose. This may be one of the reasons behind non-functioning of most of the hand pumps
in the area. Analysis results of Ground water sample collected from Pratap Nager area near CETP unit III is presented below.

### Table 8.2 Analysis Result of Ground Water collected from Pratap Nagar Area in Pali

| Parameters      | Concentration | Limits     |  \\
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>9.0</td>
<td>6.5-8.5</td>
</tr>
<tr>
<td>Conductivity µs/cm</td>
<td>11240</td>
<td>--</td>
</tr>
<tr>
<td>TDS mg/l</td>
<td>8914</td>
<td>500</td>
</tr>
<tr>
<td>TSS mg/l</td>
<td>129</td>
<td>--</td>
</tr>
<tr>
<td>Chloride Cl mg/l</td>
<td>9307</td>
<td>250</td>
</tr>
<tr>
<td>Sulphate Mg/l</td>
<td>1690</td>
<td>200</td>
</tr>
<tr>
<td>Fluoride mg/l</td>
<td>0.36</td>
<td>1.0</td>
</tr>
<tr>
<td>Total Hardness mg/l</td>
<td>1108</td>
<td>300</td>
</tr>
<tr>
<td>Calcium mg/l</td>
<td>910</td>
<td>75</td>
</tr>
<tr>
<td>Total Alkalinity mg/l</td>
<td>1084</td>
<td>--</td>
</tr>
</tbody>
</table>

- Chemical dosing in all three units need more optimization. At present dosing is being regulated by random measurement of pH. Installation of online pH meter may minimize wastage of chemical and reduction of COD and TDS created by excessive use of chemicals.
- Grit and floating material removal system needed regular / periodical cleaning.
- Sludge drying beds may be used for further drying of sludge after centrifugal system, if required.
- Being the biggest unit of Pali area M/s Maharaja Sh. Umaid Mills Limited may be directed to initiate process for recycling of their treated waste water. This may reduce load on CETP unit III and also provide a line of action for other small units.
- Intensive study of ground water in Pali area may be undertaken to formulate an action plan for ground water prevention.
- Closed pipelines and collection network is required for the wastewater generated from the industrial units. PWPCRF should ensure for proper collection, conveyance of effluent from individual units to CETP. The present practice of letting the wastewater directly into the River Bandi by the units located on the bank of the river may be discontinued immediately.

### 8.3 Performance Monitoring of Common Effluent Treatment Plants in Tirupur (Tamilnadu)

Tirupur (Tamilnadu) is one of the highly industrialized areas, where 5750 industrial units are involved in textile processing activities such as knitting, bleaching, dyeing, printing, embroidery, stitching, etc. These units generate wastewater to the tune of 100 million litres daily, which have high BOD, COD, Colour and TDS. Seven CETPs were commissioned during 1998-99 to treat about 47100 KLD of effluent at a total cost of Rs. 2961 lakhs. The effluent after preliminary treatment through the seven

Adequate effluent treatment in Tirupur consists of treatment technologies for the removal of colour, organics and total dissolved solids leading to recovery and reuse of water and salts.
existing CETPs is discharged into river canals.

These CETPs have been monitored for their performance vis-à-vis compliance of consent conditions. The important parameters such as BOD, COD and TDS were far exceeding the prescribed limits of 30 mg/l, 250 mg/l and 2100 mg/l respectively. The raw effluents have BOD in the range of 181 mg/l to 330 mg/l which is reduced by 2.4 to 25.0 % through the existing treatment facilities. Similarly, the incoming COD level (range: 540 – 752 mg/l) has been found reduced between 18.7 % and 40.7 %. As far as TDS, Chloride, Sulphates, phosphates, Sodium, Potassium and nitrogen are concerned, the reduction was negligible and in some cases their concentration in the treated effluent increased due to the usage of excess quantity of chemicals during CETP operations. The study revealed that the existing treatment facilities at CETPs are inadequate and not able to provide required treatment to meet the tolerance limits prescribed for discharge of treated effluent.

Apart from this, solid wastes are dumped haphazardly in the CETP premises as well as in other areas and its management is a big problem which needs to be addressed.

The adequate effluent treatment in Tirupur area consists of treatment technologies for the removal of colour, organics and total dissolved solids leading to recover / reuse of water and salts. The wastewater is given primary treatment by one of the technologies, i.e. oxidation-reduction technology or membrane bio-reactor technology or bio-oxidation technology and then followed by reverse osmosis (RO) and evaporation to implement ‘zero liquid discharge’ scheme. As such, all the CETPs are upgrading their treatment facilities by incorporating ‘zero discharge’ technologies such as RO, nano-filtration and multi-evaporators to reuse / recycle brine solution and treated effluents. Besides, 11 more CETPs with ‘zero discharge’ technologies are under establishment with a combined project outlay of about Rs. 33,363 lakhs to treat about 47450 KLD of effluent generated from 242 member units . All the CETPs are expected to implement and commission the operation with ‘zero discharge’ scheme around March/April 2008.

8.4 Performance Monitoring of CETPs in Gujarat and Maharashtra

Nine CETPs & FETP in Gujarat, 11 CETPs in Maharashtra were monitored by CPCB West Zone Office, Vadodara. The monitored CETPs are having primary and secondary treatment except Kurkumbh CETP in Maharashtra which is being primary treatment only. The CETP, Ranjangaon was not in operation due to power staggering. However the effluent is collected in collection sump. Inlet effluent characterization indicates significant deviation (upward) from the inlet design norms. The monitored CETPs have been found non-compliant to the prescribed norms. It was observed during monitoring that some of the CETPs have started taking domestic sewage to improve amenability to biological treatment.
### Table 8.4.1 Performance Monitoring Results of CETPs in Maharashtra State (Year 2007)

<table>
<thead>
<tr>
<th>Locations</th>
<th>Monitoring Date</th>
<th>pH</th>
<th>TSS</th>
<th>COD</th>
<th>BOD</th>
<th>NH3-N</th>
<th>Oil &amp; Grease</th>
<th>Phenols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet of CETP, Lote Parshuram</td>
<td>28.02.2007</td>
<td>7.9</td>
<td>863</td>
<td>5586</td>
<td>2267</td>
<td>1232</td>
<td>104</td>
<td>9.54</td>
</tr>
<tr>
<td>Outlet of CETP, Mahad</td>
<td>28.02.2007</td>
<td>7.6</td>
<td>498</td>
<td>3108</td>
<td>183</td>
<td>263</td>
<td>14</td>
<td>1.44</td>
</tr>
<tr>
<td>Outlet of CETP, Roha</td>
<td>28.02.2007</td>
<td>7.5</td>
<td>854</td>
<td>1554</td>
<td>238</td>
<td>274</td>
<td>16</td>
<td>0.53</td>
</tr>
<tr>
<td>Outlet of CETP, Patalganga</td>
<td>28.02.2007</td>
<td>7.4</td>
<td>87</td>
<td>206</td>
<td>37</td>
<td>11</td>
<td>7.7</td>
<td>0.4</td>
</tr>
<tr>
<td>Outlet of CETP, TTC, Navi Mumbai</td>
<td>01.03.2007</td>
<td>7.4</td>
<td>86</td>
<td>231</td>
<td>42</td>
<td>260</td>
<td>7.5</td>
<td>0.53</td>
</tr>
<tr>
<td>Outlet of CETP, Talaja</td>
<td>01.03.2007</td>
<td>7.3</td>
<td>146</td>
<td>273</td>
<td>32</td>
<td>120</td>
<td>1.5</td>
<td>0.07</td>
</tr>
<tr>
<td>Outlet of CETP, Dombivali-I</td>
<td>01.03.2007</td>
<td>7.1</td>
<td>36</td>
<td>655</td>
<td>277</td>
<td>53</td>
<td>8.2</td>
<td>9.79</td>
</tr>
<tr>
<td>Outlet of CETP, Dombivali-II</td>
<td>01.03.2007</td>
<td>7.2</td>
<td>190</td>
<td>420</td>
<td>65</td>
<td>76</td>
<td>7.5</td>
<td>0.12</td>
</tr>
<tr>
<td>Outlet of CETP(2 MLD), Tarapur</td>
<td>02.03.2007</td>
<td>7.6</td>
<td>294</td>
<td>1974</td>
<td>400</td>
<td>468</td>
<td>7.6</td>
<td>1.38</td>
</tr>
<tr>
<td>Final Outlet of CETP(25 MLD), Tarapur (after primary clarifier)</td>
<td>02.03.2007</td>
<td>6.9</td>
<td>176</td>
<td>1554</td>
<td>550</td>
<td>151</td>
<td>2.3</td>
<td>0.59</td>
</tr>
<tr>
<td>Outlet of CETP, Kurkumbh, Pune</td>
<td>26.07.2007</td>
<td>7.5</td>
<td>125</td>
<td>562</td>
<td>77</td>
<td>238</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: All values except pH are in mg/l.

### Table 8.4.2 Performance Monitoring Results of CETPs in Gujarat State (Year 2007)

<table>
<thead>
<tr>
<th>Locations</th>
<th>Monitoring Date</th>
<th>pH</th>
<th>TSS</th>
<th>COD</th>
<th>BOD</th>
<th>NH3-N</th>
<th>TKN</th>
<th>Oil &amp; Grease</th>
<th>Phenols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet of CETP, Ankleshwar</td>
<td>05.12.2007</td>
<td>7.7</td>
<td>573</td>
<td>1744</td>
<td>664</td>
<td>110</td>
<td>132</td>
<td>1.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Outlet of CETP, Panoli</td>
<td>05.12.2007</td>
<td>7.9</td>
<td>212</td>
<td>1361</td>
<td>310</td>
<td>412</td>
<td>450</td>
<td>30</td>
<td>1.6</td>
</tr>
<tr>
<td>Outlet of FETP, Ankleshwar</td>
<td>31.10.2007</td>
<td>7.0</td>
<td>353</td>
<td>1965</td>
<td>175</td>
<td>788</td>
<td>--</td>
<td>33.8</td>
<td>17.3</td>
</tr>
<tr>
<td>Outlet of CETP, Vapi</td>
<td>01.11.2007</td>
<td>6.8</td>
<td>286</td>
<td>837</td>
<td>93</td>
<td>234</td>
<td>--</td>
<td>12.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Outlet of CETP, Padra</td>
<td>05.01.2007</td>
<td>7.1</td>
<td>228</td>
<td>855</td>
<td>460</td>
<td>140</td>
<td>171</td>
<td>7.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Outlet of CETP (Chemical) Surat</td>
<td>15.01.2007</td>
<td>8.1</td>
<td>82</td>
<td>356</td>
<td>48</td>
<td>190</td>
<td>194</td>
<td>8.1</td>
<td>0.26</td>
</tr>
<tr>
<td>Outlet of CETP (Textile) Surat</td>
<td>15.01.2007</td>
<td>6.8</td>
<td>152</td>
<td>210</td>
<td>37</td>
<td>6.4</td>
<td>8.4</td>
<td>9.1</td>
<td>0.36</td>
</tr>
<tr>
<td>Outlet of CETP, Nandesari</td>
<td>15.03.2007</td>
<td>8.2</td>
<td>228</td>
<td>649</td>
<td>77</td>
<td>132</td>
<td>--</td>
<td>--</td>
<td>0.66</td>
</tr>
<tr>
<td>Outlet of CETP, Jetpur, Dist. Rajkot</td>
<td>15.03.2007</td>
<td>7.3</td>
<td>173</td>
<td>512</td>
<td>215</td>
<td>12.3</td>
<td>14.6</td>
<td>23</td>
<td>0.36</td>
</tr>
<tr>
<td>Outlet of CETP, Dhareshwar, Navagadh</td>
<td>15.03.2007</td>
<td>7.1</td>
<td>201</td>
<td>784</td>
<td>355</td>
<td>65</td>
<td>69</td>
<td>14</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Note: All parameters except pH are in mg/l.
8.5 Common Effluent Treatment Plant (CETP) Monitoring at Mathura, Uttar Pradesh

The primary objective of Common Effluent Treatment Plant (CETP) at Mathura was to treat effluents from printing of cotton sarees (30 units, with designed capacity of 6.25 mld). The CETPs based on activated sludge process was commissioned in December 1997. The CETP is receiving effluent water presently from 16-17 (synthetic polyester yarn sarees) units and the estimated total inflow is only 2-3 mld. During the inspection of the plant, it was observed that there was: (a) oil and grease in the effluent water but now oil & grease trap in the plant; (b) no biomass in the aeration tank; (c) non-functioning of V-notch; and (d) nil or no sludge generation etc. The final effluent quality is depicted below. The treated water is discharged (not complying with the norms) to Abma Khar drain, which terminates in river Yamuna.

<table>
<thead>
<tr>
<th>CETP</th>
<th>Design Capacity</th>
<th>pH</th>
<th>TSS</th>
<th>COD</th>
<th>BOD</th>
<th>NH3-N</th>
<th>TKN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet of CETP, Vapi (May 2007)</td>
<td>55 MLD</td>
<td>7.2</td>
<td>141</td>
<td>836</td>
<td>135</td>
<td>282</td>
<td>314</td>
</tr>
<tr>
<td>Outlet of CETP, Ankleshwar (June, 07)</td>
<td>40 MLD</td>
<td>7.5</td>
<td>395</td>
<td>1341</td>
<td>94</td>
<td>688</td>
<td>724</td>
</tr>
</tbody>
</table>

Table 8.4.3 Status of Compliance of CETP, Vapi & FETP, Ankleshwar in Gujarat

<table>
<thead>
<tr>
<th>Heavy metals mg/l</th>
<th>Cu</th>
<th>Cd</th>
<th>Cr</th>
<th>Pb</th>
<th>Ni</th>
<th>Zn</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet of CETP, Vapi (May, 07)</td>
<td>0.148</td>
<td>BDL</td>
<td>0.180</td>
<td>0.015</td>
<td>0.217</td>
<td>0.337</td>
<td>5.706</td>
</tr>
<tr>
<td>Outlet of CETP, Ankleshwar (June, 07)</td>
<td>3.641</td>
<td>BDL</td>
<td>0.034</td>
<td>0.016</td>
<td>0.2478</td>
<td>0.3591</td>
<td>2.145</td>
</tr>
</tbody>
</table>

8.6 Performance Status of CETP at Calcutta Leather Complex, Bantala, West Bengal

The Calcutta Leather Complex (CLC) has been developed for relocation of 423 tanneries, which were haphazardly established in Kolkata. A modular CETP of capacity 30 MLD being constructed in this complex to treat the wastewater generated by tanneries in CLC. Out of 6 CETP modules of 5 MLD each, only 4 modules of total capacity 20 MLD are constructed and operational while two other modules of capacity 5 MLD each are yet to be constructed. The complex were visited by CPCB during October 2007 and salient observations are as below:

- Out of 423 industries to be relocated in CLC, 357 has obtained NOC from WBSPCB and only 148 industries are granted consent for operation in CLC. 98 industries obtained NOCs from WBSPCB out of which, 49 industries have been granted consent for operation. A total of 197 industries only are operational in CLC.
- 154 industries have provided chrome recovery plant at individual level,
25 industries are using common mobile chrome recovery plant and rest 9 units are sharing others chrome recovery plant.

- However, no data is available with the tannery association on re-use of recovered chromium.
- All the tannery units have provided primary treatment plant to treat their effluent before sending effluent to CETP for secondary treatment.
- There are no automatic monitoring instrument except DO metre is provided in CETP.
- Only 7.5 MLD effluent is being passed through the CETP, as this is the maximum discharged capacity of the outlet. The rest 9 MLD treated effluent is being by passed through a nullah.
- No initiation yet being made to install the 5th and 6th modules of additional capacity of 10 MLD.
- The treated effluent from CETP is being discharged into a canal, which eventually meets saline zone of the river at the downstream.
- No scientific TSDF site has been developed to dispose hazardous waste. However, at present hazardous waste is being stored at site and finally sent to common TSDF located at Haldia.
- The industries sell their processed sludge like flesh, leather trimmings, shaving dust etc. However, except chromium, industries do not recover any by-products like salt and other chemicals from the wastes.
- The analysis results of CETP sludge show high concentration of total chromium (32764 mg/kg).
- No groundwater monitoring around the CLC is undertaken by the CLC.

8.7 Based on the inspection visit, following recommendations have been suggested:

- WBSPCB should ensure the re-location of 423 tanneries in CLC and appropriate action may be initiated against the tanneries that are not showing interest to shift.
- All the tanneries should provide the flow metres at the inlet of water intake as well as outlet of primary effluent treatment plant.
- The Association should keep the details of reuse of chromium by the tanneries and submit report to Pollution Control Board.
- The Association/CETP should enhance the pumping capacity of the outlet of the CETP from 7.5 MLD to 30 MLD to avoid the bypass.
- The Association/CETP should initiate installation of 5th and 6th modules of capacity 10 MLD.
- A common TSDF site should be developed for the CLC for scientific disposal of tannery sludge.
- The Association/CETP should reduce the consumption of chemicals by adopting recovery of by-products and chemicals.
- Association/CETP should carry out groundwater monitoring around the complex to check any deterioration of groundwater due to seepage of tannery effluent into the ground.

CPCB has undertaken pollution assessment for organic analysis at Vapi along with assessment of CETP performance, and impact of effluent on the river.
8.8 Pollution Assessment including evaluation of CETP in Bharuch Region
As a follow-up in complaints received from local NGOs regarding the pollution problems in Bharuch region, a detailed compliance verification exercise was taken up, covering inspection/monitoring in 96 industrial units including CETPs at Ankleshwar and Panoli. The Final Effluent Treatment Plant (FETP), provided for the purpose of final polishing treatment to the effluents generated from all three industrial estates viz: Ankleshwar, Panoli and Jagadia before disposal to the Arabian Sea through a closed pipeline, was also monitored along with ambient air/water quality monitoring and ground water quality monitoring in the area.

Based on the pollution assessment, necessary directions were issued to 12 units under Section 5 of Environment (Protection) Act, and to the Chairman, GPCB under Section 18 (1) (b) of Water/Air Act for issuing further directions to 45 industrial units including CETPs, apart from separate communications to the Dept. of Environment, Govt. of Gujarat and GSPCB, in this regard, for improvement in the situation. Regular follow up is being carried out on the industries which are issued directions under Section 5 of the Environment (Protection) Act, 1986.

8.9 Pollution Assessment including Evaluation of CETP in Vapi-Daman Region
River Damanganga, in Vapi to Daman stretch, is facing severe pollution problems due to the discharge of high quantum of organic and inorganic pollutants into the river through some industrial outfalls including a major outfall of CETP at Vapi. There are complaints from NGOs, Administration at UT of Daman, Diu & Dadra Nagar Haveli, Ministry of Home Affairs (Government of India) due to water pollution and frequent fish killings at Damanganga Estuary.

The CPCB has undertaken pollution assessment for organic analysis at Vapi (having major water pollution potential and less biological amenability), along with assessment of CETP performance, and impact of effluent on the river. Total 34 industrial units including organic intermediate manufacturers (mainly in dye, pharma and pesticide sector) had been visited, and monitoring at CETP and Damanganga were undertaken. Nine pharma formulation units of Daman area were visited for pollution potential assessment. The distilleries were also monitored during December 2006.

The direction have been issued by CPCB under Sec 5 of the Environment (Protection) Act to M/s VWEMCL i.e. CETP, Vapi and directions, under Sec 18 (1) (b) of Water Act, to Gujarat Pollution Control Board for taking necessary action against the 24 defaulter units in December 2006. Similarly, directions to Pollution Control Committee, Daman for further issuance of direction for improvement at six units and letter were sent to PCC, Daman for necessary corrective measures.

Further, a review Meeting was held on June 07, 2007 and subsequent
to joint visit by CPCB, Zonal Office & GSPCB to CETP; a modified direction was issued to CETP. Accordingly, CETP submitted bank guarantee of Rs. 50 Lakh to CPCB and expected to up-grade the CETP so as to meet the norms by March 2008.

8.10 Performance Evaluation of CETPs in North Zone

Performance evaluation of CETPs at Kanpur, Unnao, Banthar, Faridabad and Jallandhar was undertaken. The salient findings as emerged out during Performance Evaluation Study and the Treatment Efficiency (% reduction) are presented below:

- **CETP, Kanpur:**
  The plant is operational on 75% hydraulic capacity.

- **CETP- Unnao:**
  The plant is in regular operation, yet the performance needs further improvement. The overall treatment economics of the plant has been good. The plant management has provided storage provision for hazardous waste from CETP.

- **CETP Faridabad:**
  The CETP at Faridabad was installed in January 2004. The total designed capacity of the plant is 600 KLD (300 KLD for alkaline and 300 KLD for acidic effluent) with a membership of 195 units, which mainly comprises of electroplating units and contribute about 94-98 KL effluent per day. The effluent from various units is received through tankers. Characteristics of samples from different units of the plant are as under:

<table>
<thead>
<tr>
<th>Sampling Location</th>
<th>pH</th>
<th>SS</th>
<th>Oil &amp; Grease</th>
<th>Cr (VI)</th>
<th>COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet of alkaline effluent</td>
<td>2.49</td>
<td>2195</td>
<td>71.61</td>
<td>ND</td>
<td>559</td>
</tr>
<tr>
<td>Equalization tank (alkaline effluent)</td>
<td>1.79</td>
<td>261</td>
<td>--</td>
<td>--</td>
<td>424</td>
</tr>
<tr>
<td>After reaction tank of alkaline effluent</td>
<td>4.01</td>
<td>1054</td>
<td>--</td>
<td>--</td>
<td>876</td>
</tr>
<tr>
<td>Final outlet of alkaline effluent</td>
<td>7.42</td>
<td>200</td>
<td>5</td>
<td>0.052</td>
<td>456</td>
</tr>
<tr>
<td>Inlet of acidic effluent</td>
<td>2.7</td>
<td>118</td>
<td>--</td>
<td>1.85</td>
<td>476</td>
</tr>
<tr>
<td>Equalization tank (acidic effluent)</td>
<td>2.44</td>
<td>50</td>
<td>--</td>
<td>--</td>
<td>304</td>
</tr>
<tr>
<td>After reaction tank of acidic effluent</td>
<td>6.05</td>
<td>103</td>
<td>--</td>
<td>--</td>
<td>374</td>
</tr>
<tr>
<td>Final outlet of acidic effluent</td>
<td>6.26</td>
<td>202</td>
<td>--</td>
<td>ND</td>
<td>386</td>
</tr>
</tbody>
</table>

All values except pH are in mg/l.

- **CETP Banthar:**
  The Common Effluent Treatment Plant (capacity: 4.5 MLD) has been established and is currently under stabilization. The plant receives about 1.5 – 1.8 MLD of wastewater as against its treatment capacity of 4.5 MLD. Out of 43 tannery units proposed to be established in the Leather Technology Park project, only 10 units have been established and resumed operations. The provision of 1.7 km pucca drain for conveyance in processing of textiles, the industry uses dyes, chemicals, auxiliary chemicals and sizing materials.
of treated wastewater from the CETP to Jail drain has been completed and the treated effluent after confluence with Jail drain is discharged to river Ganga after traversing a distance of about 30 km.

**CETP Jallandhar:**
The CETP is operational. However it is currently under stabilization for only 1.5 MLD tannery effluent. Proper treatment facility for 3 to 3.5 MLD effluent is yet to be provided at CETP.

### 8.11 Effluent Management in Textile Industries

In processing of textiles, the industry uses dyes, chemicals, auxiliary chemicals and sizing materials. The contaminated waste water is generated during the process which can cause environmental problems unless properly treated before its disposal. The CPCB carried out studies of few textile industries recently with a view to suggest various options for redressed of pollution problems of the units and on the basis of the study, the report - Advance Methods for Treatment of Textile Industry Effluents, March 2007 has been published. The findings and recommendations of the study are presented below:

- **Textile industry effluent can be treated with or without segregation of effluent streams collectively and can give recovery of water but the recovery of salt may not be feasible. Segregation of effluent streams on other hand makes it possible to recover both water and salts. The highly polluting effluent streams such as spent dye bath has low volume, which is normally 10 per cent of the total effluent discharge. The remaining 90 per cent of effluent is contributed by low polluting streams like wash water.**

- **The highly polluting effluent stream can be segregated and treated separately. This stream has low volume and as such, it can be disposed of through solar evaporation pond wherever adequate land is available. In case of land constraints, this waste steam can be concentrated further to reduce volume using suitable evaporation system. The other low polluting streams can be given primary/secondary/tertiary treatment to meet the disposal standards or for reuse in industry for appropriate operations. With the application of reverse osmosis, the effluent stream can be made suitable for reuse in production process itself. The reject stream of reverse osmosis is to be treated along with high polluting effluent stream.**

- **Spent dye bath effluent can be segregated and treated with recovery of salt. This effluent can be treated using a primary treatment followed by evaporation and crystallization. Glauber salt (Sodium, Sulthate decahydrate, Na2 SO4. 10H2O) based dyeing enables recovery of the salt. The other effluent stream i.e. wash water can be treated separately in primary/secondary/tertiary treatment to meet the disposal standards or for reuse. It can also be treated with reverse osmosis system to recover and recycle water. The reject stream of reverse osmosis is to be treated along with high polluting effluent stream.**
Spent dye bath effluent should be segregated from wash water streams. Dye bath effluent is to be treated using a nanofiltration system and wash water effluent with reverse osmosis. Nanofiltration allows maximum passage of the salt with no colour in the permeate. As such, the permeate can be directly recycled back to dye bath so as to minimize fresh addition of salt. For this option common salt (Sodium Chloride, NaCl) is to be used in dyeing process. The rejects of reverse osmosis and nano-filtration can be disposed off through solar evaporation ponds or other evaporation system.

The effluent stream arising out of textile processing can be collectively treated using primary/secondary/tertiary treatment to meet the disposal standards. In case water is intended to be reused, the treated water can be further purified with use of reverse osmosis or other methods. The reject stream of reverse osmosis can be disposed off through solar evaporation ponds or other evaporation system. While recovering the water and salts, these schemes also reduce problems relating to disposal of effluents in industries. Returns on account of reuse of water and salt can offset recurring cost of treatment system to a large extent and can be advantageous in places where there is water scarcity.

8.12 Status of Environment in Cement Plants in Gujarat and Maharashtra

The development of cement industry in India has come a long way since 1914, when the first cement plant was commissioned with a production of 1000 tons/annum. Today, India is the second largest cement producing country in the world with a production of about 99 million tones (about 5% of world production). The cement production installed capacity is about 119 million tones with an expected 10% growth rate per annum.

However, cement consumption per capita in our country at about 99 kg/capita is one of the lowest in the world. The world average is about 267 kg/capita, while that of China is 450 kg/capita. Similarly, in Japan it is 631 kg/capita while in France it is 447 kg/capita. With advent of technology, the cement plants have mostly changed from the wet process to the energy efficient dry process. Out of 157 cement kilns, 117 are dry process based, 32 are based on wet process and 8 on semi dry. Though the best of our cement industry matches well with world standards in terms of energy efficiency but the average performance of the Indian cement industry is lagging behind with respect to the pollution control. In the coming years, in order to survive and grow in the globalized market, rapid modernization and adoption of cost effective energy efficient and environment friendly technologies will be essential for viability of the industry at global scale.

In order to assess the overall environmental status and the effectiveness of the pollution control systems at cement plants located in Gujarat, CPCB West Zone Office, Vadodara has prepared a questionnaire and circulated among the cement plants located in Gujarat for the collection of information/data. There are around 12 cement plants located across
the state. The monitoring of cement plants in Gujarat was carried out at five plants on random basis for source emissions at raw mill/kilns, cooler, cement mills etc. Ambient Air Quality Monitoring was also carried out in and around the cement plants located in Gujarat state. The results reveal that the SPM levels exceeded the prescribed standards at some of the monitored areas. Almost all the places the SO2 levels were observed as below detection limit. The measured NOx values were also within the prescribed standards. The observations are as below:

❯ The Cement plants (5 Nos.) which were monitored are comprehensive cement plants i.e. having the facilities for the production of clinker and various categories of cement products like OPC and PPC etc.
❯ It was observed during the monitoring that, more or less all the above plants have adopted same type of pollution control systems like, bag house for kiln, raw mill, ESP for cooler, bag house for coal mill and cement mill.
❯ During the monitoring it was observed that at almost all the cement plants, the background dust is contributing particulates to the work place environment.
❯ The monitoring results reveal that SPM levels in ambient air have exceeded the consent limit in some cases while the NOx values are well within the prescribed norms.
❯ The particulate matter (SPM) was measured highest (6806 mg/m3) at the cement plants at Jamnagar.

8.13 Monitoring of Electroplating Industries located in and around Kolkata

The information regarding electroplating industries in and around Kolkata has been obtained from WBSPCB. Nine electroplating industries were monitored for the preparation of a comprehensive industry document on electroplating industries. The observations during the monitoring and recommendations are as below:

❯ The housekeeping was found miserable and working spaces are very less.
❯ The consents have expired long back and industry did not applied for the renewal.
❯ Industries are using hazardous chemicals like NaCN, Cd, H2SO4, CuSO4, ZnPO4 but unfortunately storage facility is not scientifically maintained.
❯ Industries did not provide any ETP for the treatment of effluents. The untreated toxic effluents are directly being discharged into the municipal drain, which eventually meets the Ganga.
❯ The toxic sludge is directly dumped into the municipal vat, which eventually reaches municipal landfill area poses risks to the health of the rag pickers.
❯ No safety measures have been taken by the industries to protect the health of the factory workers.
The analysis results of the samples collected from the outlet of the industry drain show that effluents contain highly toxic pollutant.
The fugitive emission monitored inside the industries’ premises indicated the presence of Cyanide vapour in the air, which is definitely harmful for the workers.

Recommendations:

- Large number of electroplating industries are situated in the residential cum commercial areas and creating huge air as well as water pollution posing risks to the health of the nearby residing population. Therefore, industry should be shifted to industrial area.
- Wastewater treatment facility should be installed by all the industries. In case of cluster of electroplating industries, the CETP should be set up.
- Proper pollution control measures should be adopted to control fugitive emissions.
- System should be devised to reduce water use as it is possible to achieve 50-90% reduction in traditional water consumption. Recycling of used rinse waters into the makeup solutions of their respective treating baths should be adopted.
- Regular analysis and regeneration of process solution may be undertaken to increase the life of plating bath.
- Spent bath solution should be sent for recovery and regeneration of plating chemicals instead of directly discharging into municipal drain.
- Segregation of waste is essential to avoid dangerous secondary reactions that can happen, for example, strong acid and caustic reactions can generate boiling and splashing of corrosive liquid. Acid can react with cyanides and generate lethal hydrogen cyanide gas.
- Most of the industries have not renewed the consent with the State Pollution Control Board. SPCB should identify defaulters and initiate proper stringent action against them.

8.14 Compliance Monitoring of M/s Hindalco Industries Limited, Muri, Jharkhand

Pursuant to the recommendation made by the Hon’ble Committee of Parliament on Petition, Govt. of India, CPCB, Zonal Office, Kolkata along with the officials of Jharkhand State Pollution Control Board, Regional Office, Ranchi inspected the industry and its surroundings between 3 and 5 October 2007 to assess the latest compliance status of the industry and environmental conditions in nearby areas. The progress made by the industries on respective proposals with respect to the directions issued to the industry by CPCB, Delhi based on earlier in-depth study of the environmental management practices and environmental concerns in the proximity of the industry has been reviewed. Necessary instructions based on the observations/recommendations as approved by MoEF, Govt. of India, has been issued to the industries for its implementation.
8.15 Environmental Surveillance Squad (ESS) Activities

**West Zone:**

The CPCB West Zone Office has undertaken surprise inspection visits to 18 industries during the year under ESS programme. The inspection reports with necessary recommendations have been submitted.

- Visit to M/s Indian Rayon Ltd, Veraval, Gujarat: Visited and monitoring has been carried out at M/s Indian Rayon Ltd along with the officials of MoEF, Regional Office Bhopal for compliance verification.
- Visit to ONGC Drilling site at Dahej: The CPCB team has visited the ONGC drilling site located at Gandhar to study methodologies of the drilling operation and its associated environmental impacts.
- Visit to M/s Essar Oil Refinery/ M/s Reliance Industries, Jamnagar: Visited the two industries to verify the follow up action after fire accidents.
- Visit to Ports and Customs Dept: Visited Mumbai Port, Jawaharlal Nehru Port Trust (JNPT), Customs Department in Mumbai as follow up of the Hon’ble Supreme Court directions along with official from Head Office and Maharashtra Pollution Control Board. Similar visits were undertaken to Kandla Port/Custom Department at Kandla in Gujarat State.
- Visit to Fluorescent Tubes/Light Manufacturing Units: Visited M/s Philips Electronics India Ltd, M/s Crompton Greaves Ltd Dist. Vadodara and M/s GE India Industrial Pvt Ltd, Dist. Kheda for collection of baseline data regarding Mercury in different components of environment including toxicological, bio-accumulation and health impact as desired by MoEF, New Delhi.

**Central Zone:**

Thirteen industries were inspected under ESS and all the inspection reports were forwarded:

- Visit to M/s Kedia Castle Dalleon Industries Ltd., Durg: The Industry was inspected for verifying the compliance of Standards. The inspection report was submitted.
- Visit to M/s Seagram India Ltd. Behror and M/s Globus Agronics, Behror, Rajasthan: The performance study of process and ETPs at the grain-based distilleries was conducted.

**North Zone:**

Under the activity, 13 industries have been inspected in Uttar Pradesh, Delhi, Himachal Pradesh and Punjab, which comprises of pesticides, distillery, sugar and pulp and paper industries.

- Joint Inspection with MoEF: CPCB has taken up joint monitoring of industries in association with MoEF to have better implementation of the projects for which clearance was granted by MoEF. Joint inspection of 16 industries with the officers of MoEF was made in Haryana, Himachal Pradesh, Punjab and Jammu & Kashmir.
South Zone:
The Environmental Surveillance Squad of Central Pollution Control Board South Zone Office, Bangalore has carried out surprise inspections of 14 randomly selected industries during the year to ascertain whether the pollution control systems installed by the major polluting industries are properly functioning and also to verify the compliance of consent conditions. Based on the findings directions for closure in cases of major violation and other actions were taken. Other cases were forwarded to respective SPCBs for ensuring improvements.

East Zone:
Court Cases in Bihar and Jharkhand: Follow-up in four writ petition in the Hon’ble Court of Patna and Ranchi, in which CPCB is respondent, is being undertaken on regular basis and all information as and when required are collected and furnished to the lawyer for timely submission to the Court.

- CWJC No. 3047/2006, in the Hon’ble High Court of Patna - North Bihar Leather Industries & Others Vs. State of Bihar & Others - matter pertaining to Tanneries in Muzaffarpur
- WP PIL 6505 of 2003 in the Hon’ble High Court of Jharkhand Om Prakash Vs CPCB and Others – matter pertaining to pollution in River Damodar
- CWJP No 12795 of 2006 – Sri. Shashank Shekher Vs The State of Bihar & Others listed before Hon’ble High Court of Patna – matter pertaining to Municipal Solid Waste Management
- C.W.J.C. No. 95 of 2007 – M/s. SCI India Ltd., & Others Vs. The State of Bihar & Othrs – matter pertaining to Closure of M/s. SCI India Ltd., Banka

North East Zone:
Eighteen (18) industries in the North Eastern States were visited under the ESS Programme. Besides, Six (6) other industries were also visited jointly with MoEF officials for verification of compliance of Environmental Clearance Conditions.